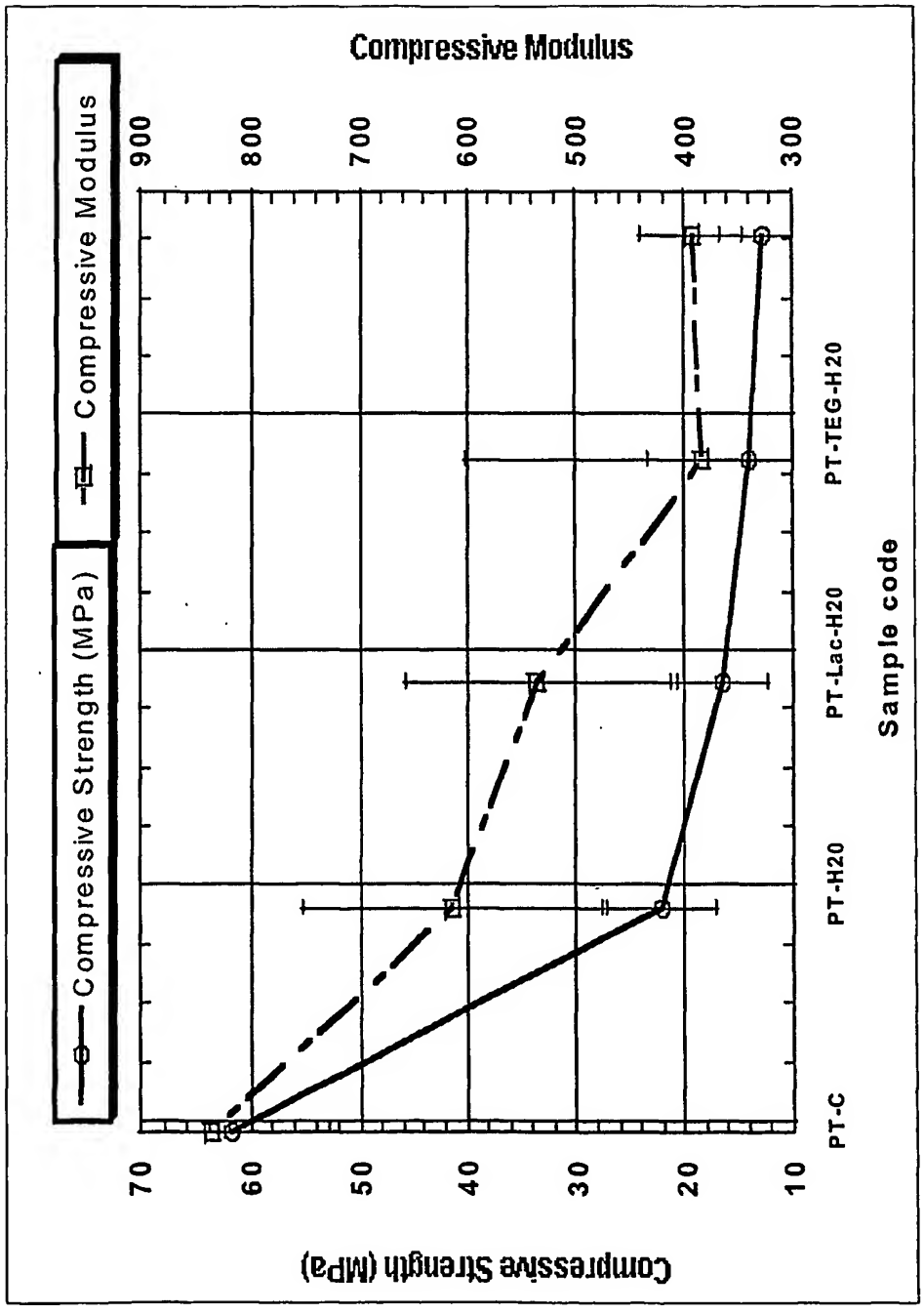
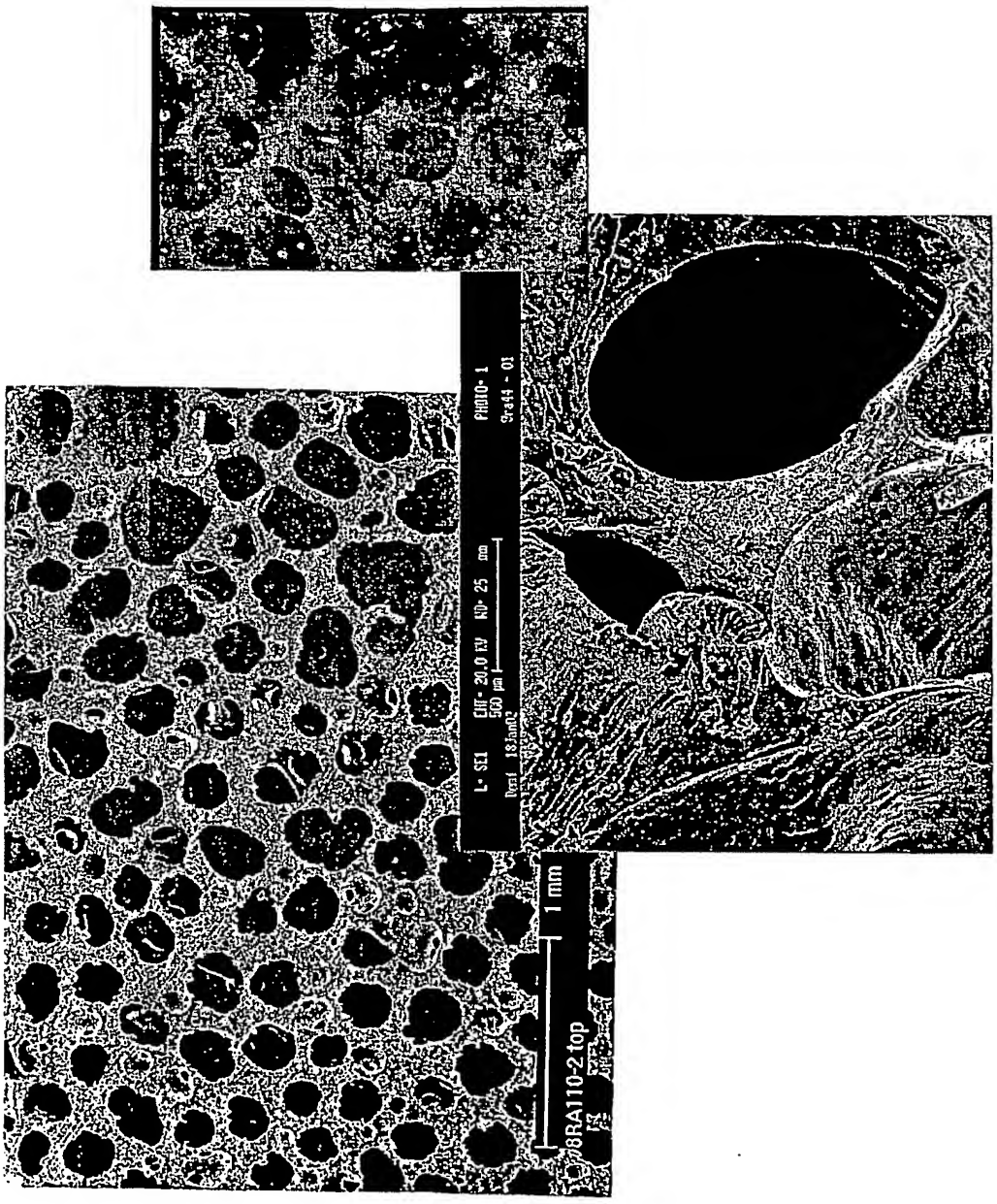


Figure 1

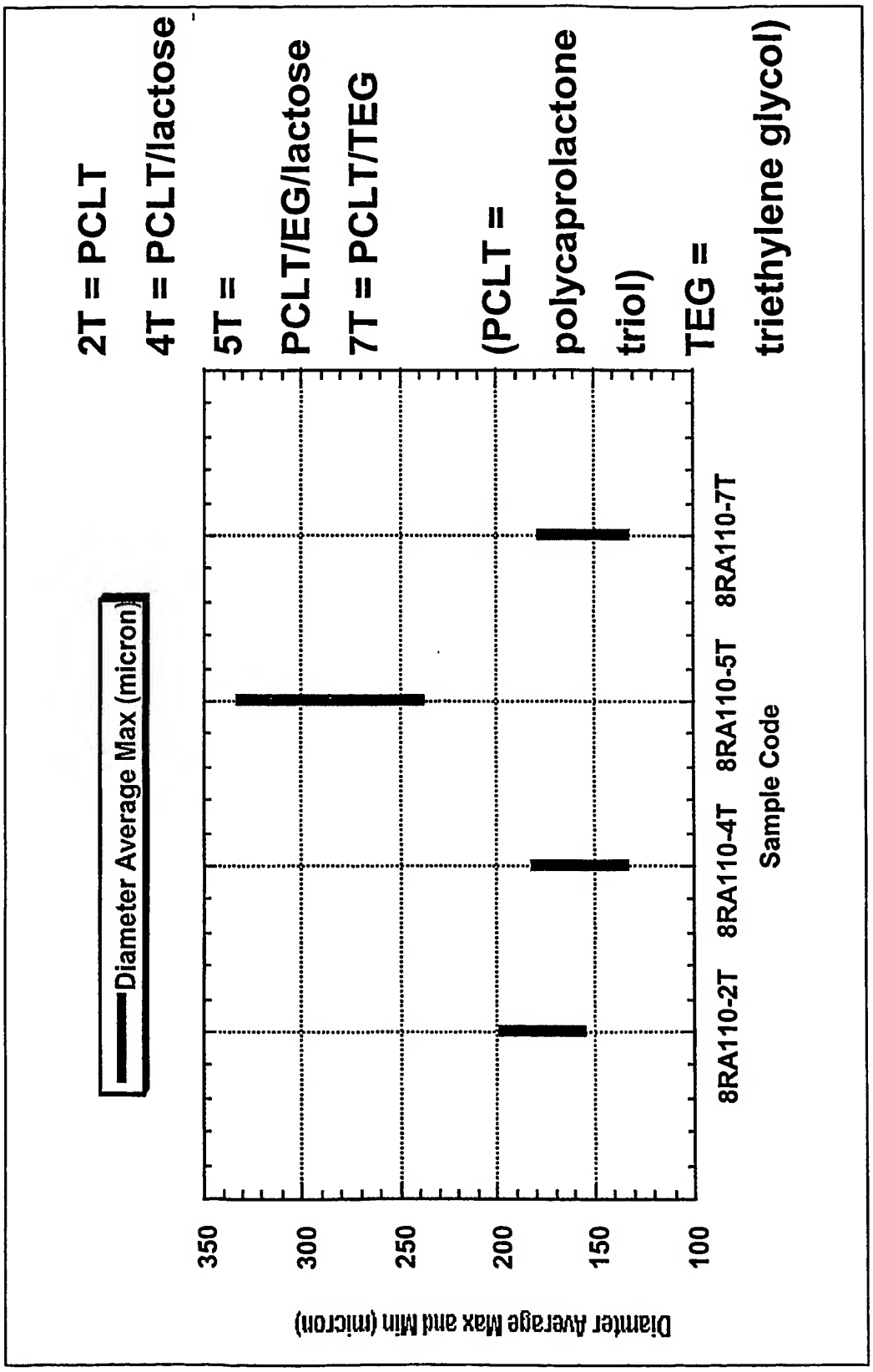
Effect of water, lactose, and triethylene glycol (TEG) on compressive strength



SEM of a porous polymer scaffold

Figure 2

Figure 3



Effect of different degradable cross-linker structure on average porosity

HA + hydroxyapatite
PSA = poly(sebasic anhydride)
PLGA = poly(glycolic) and poly(lactic acid) copolymer
SAP = silica particles

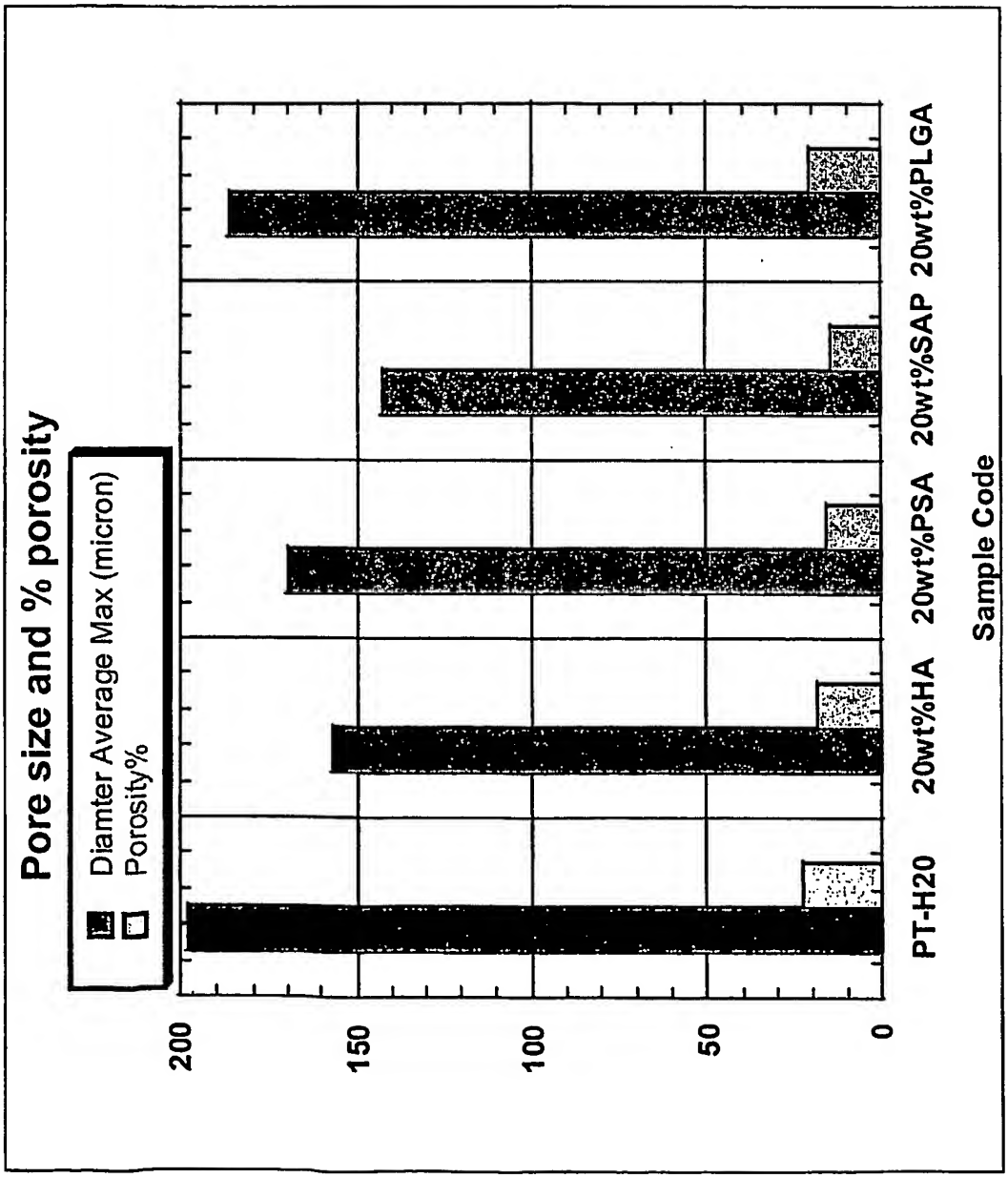


Figure 4

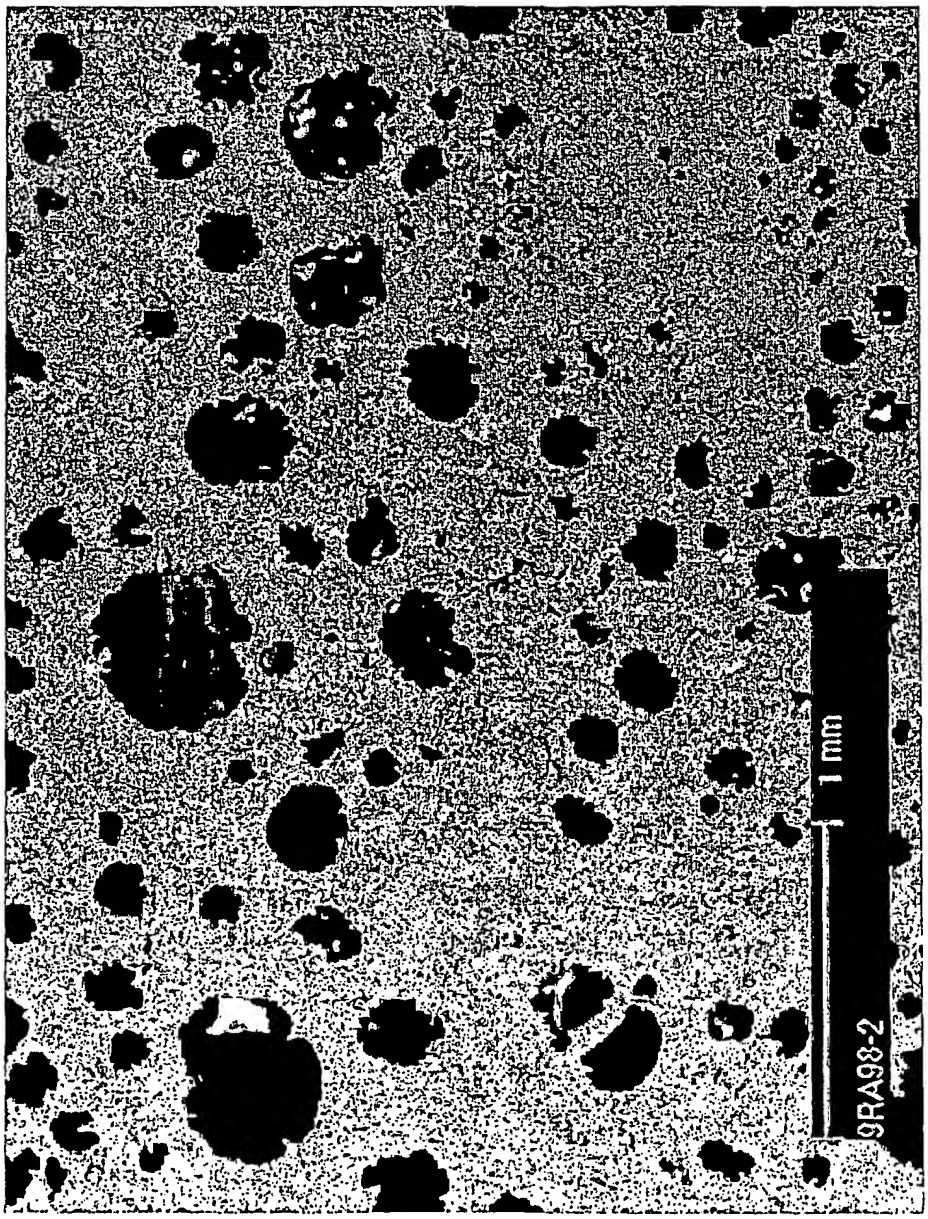
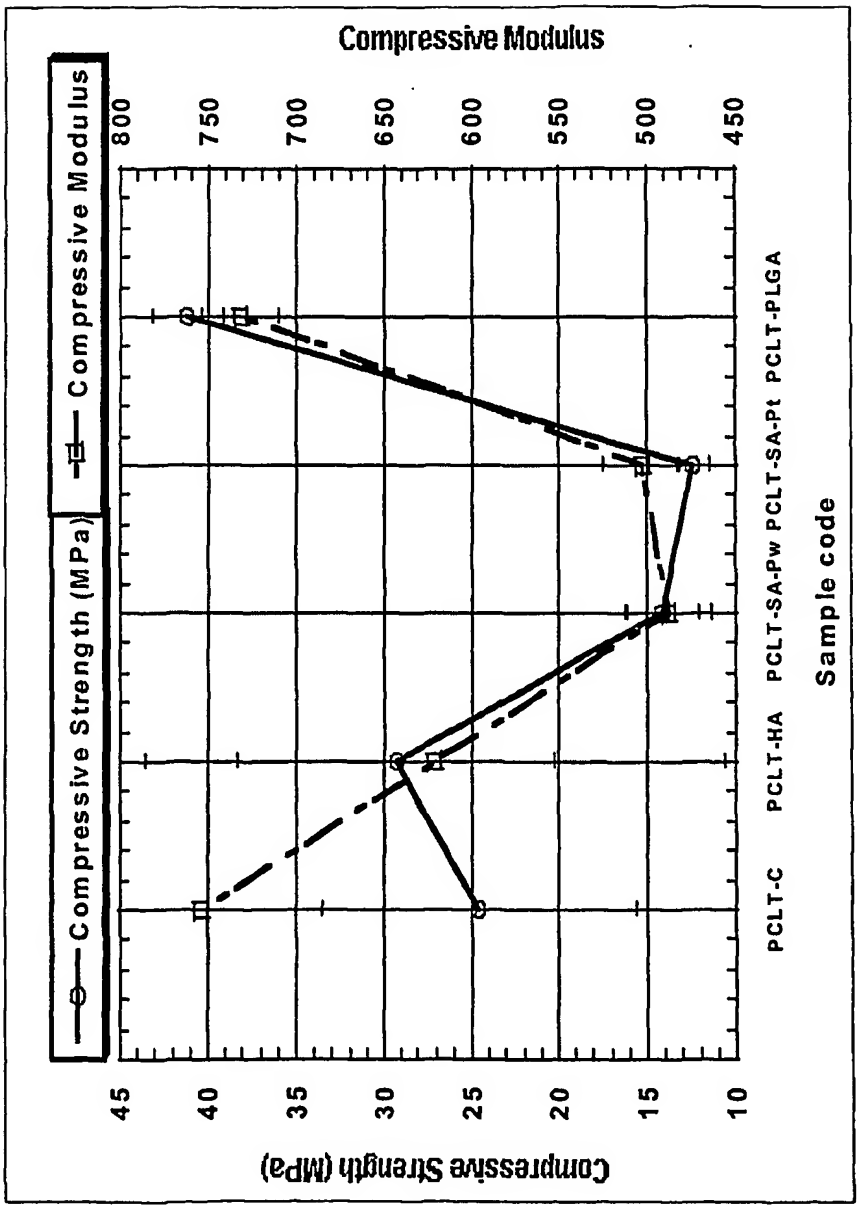


Figure 5

Incorporation of fillers changes pore structure



PCLT-C = polycaprolactone triol, PCLT-HA = (hydroxyapatite), PCLT-SA-PW = silica powder, PCLT-SA-Pt = silica powder, PCLT-PLGA = poly(glycolic and lactic acid) copolymer

Figure 6

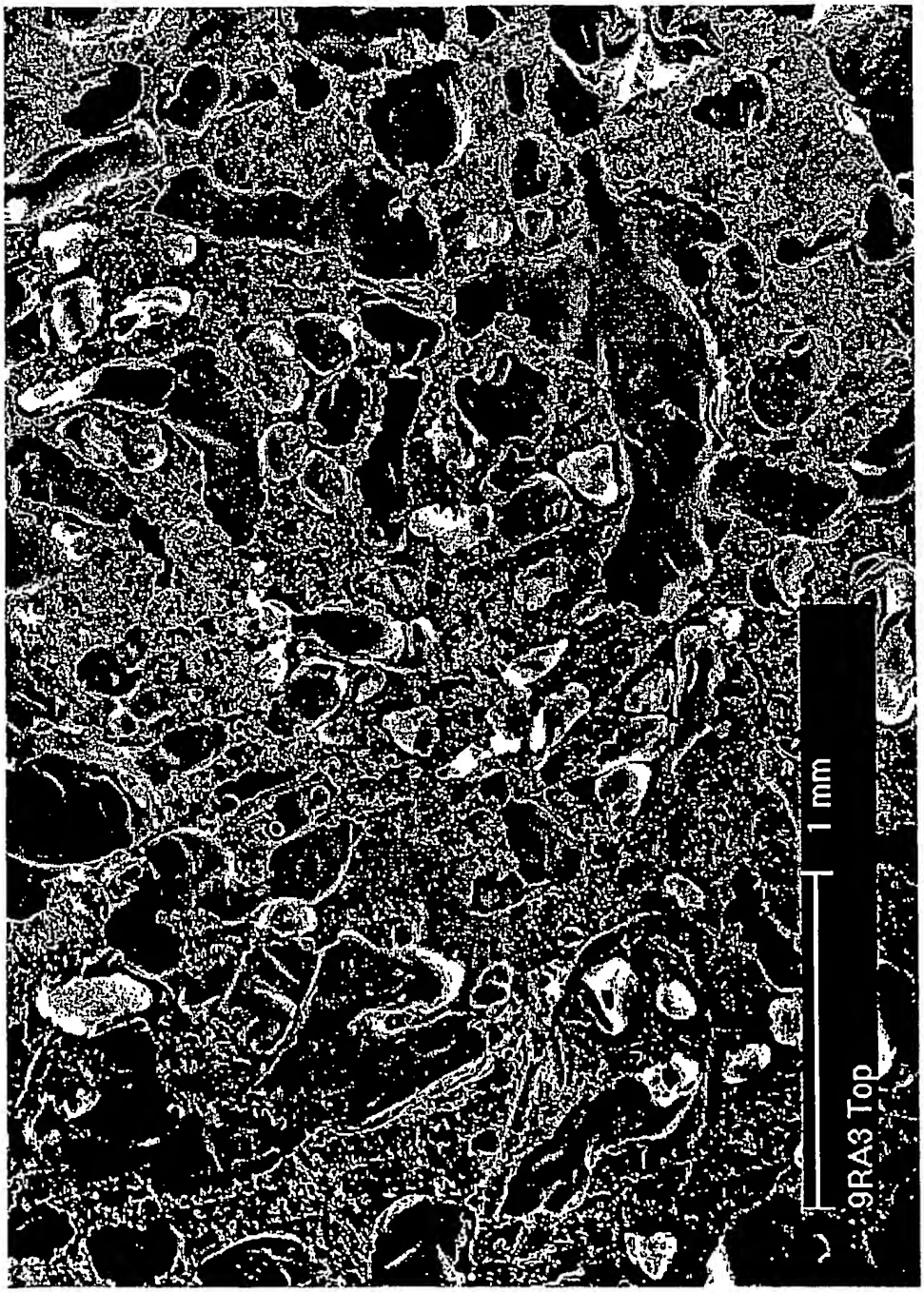


Figure 7

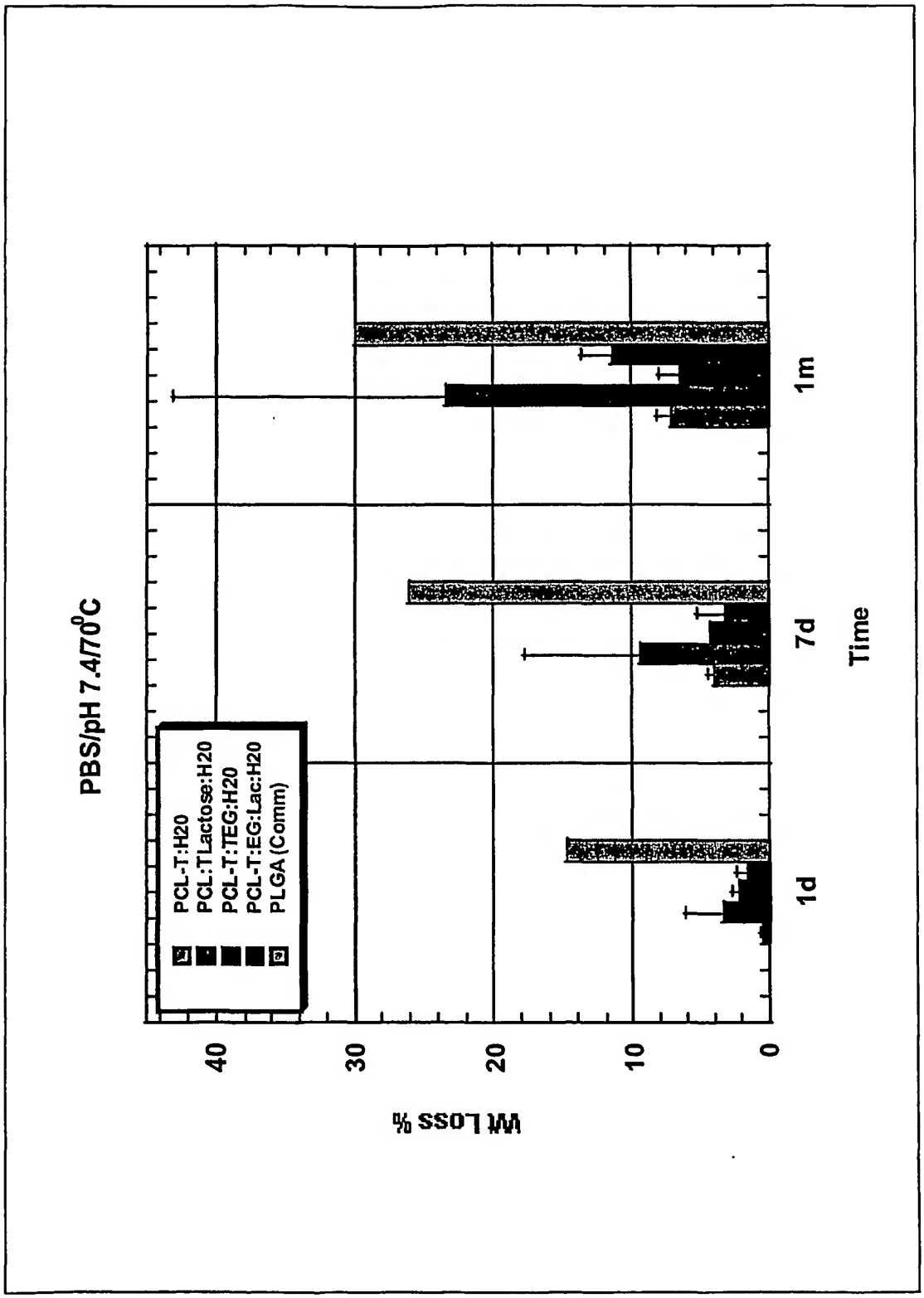

PBS/pH 7.4/70°C
PCL-T:H20
PCL:TLactose:H20
PCL-T:TEG:H20
PCL-T:EG:Lac:H20
PLGA (Comm)
Wt Loss %
0
10
20
30
40
1d
7d
1m
Time

Figure 8

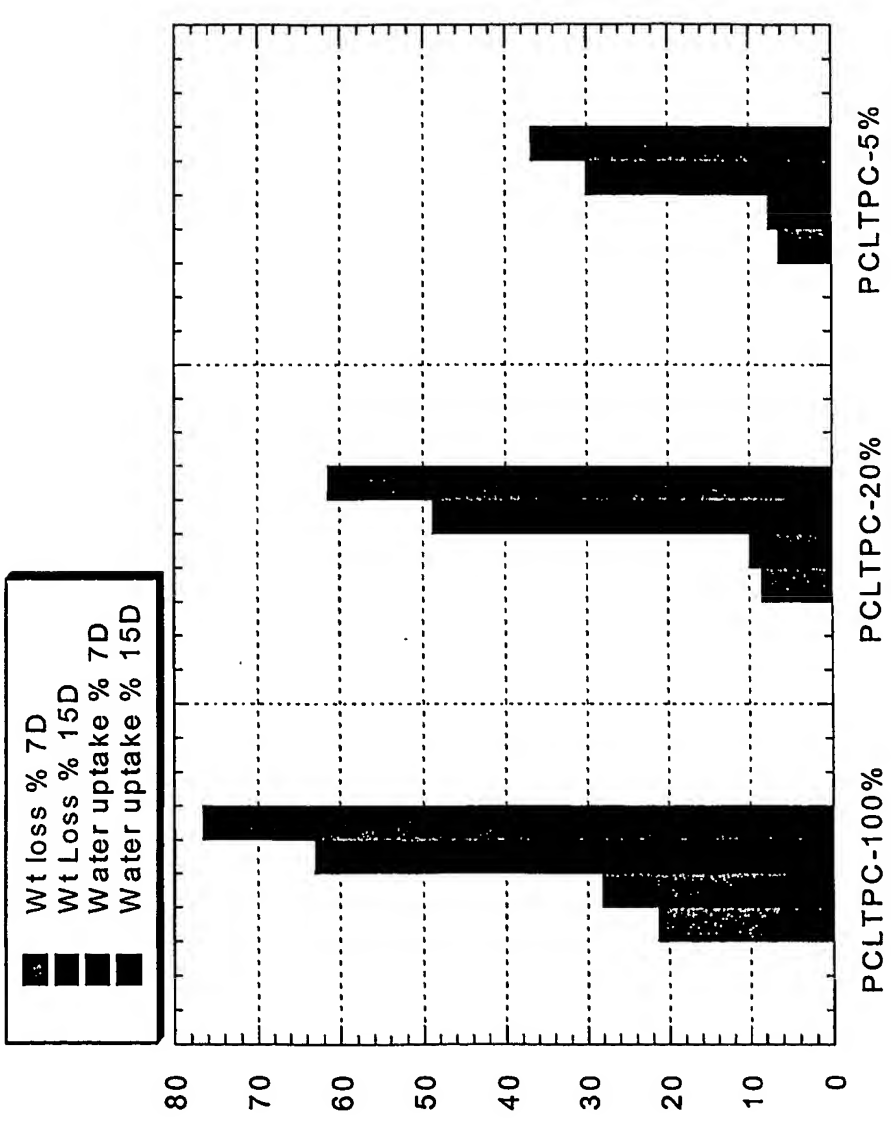


Figure 9

Effect of incorporating phosphocholine modified polycaprolactone triol on hydrolytic degradation

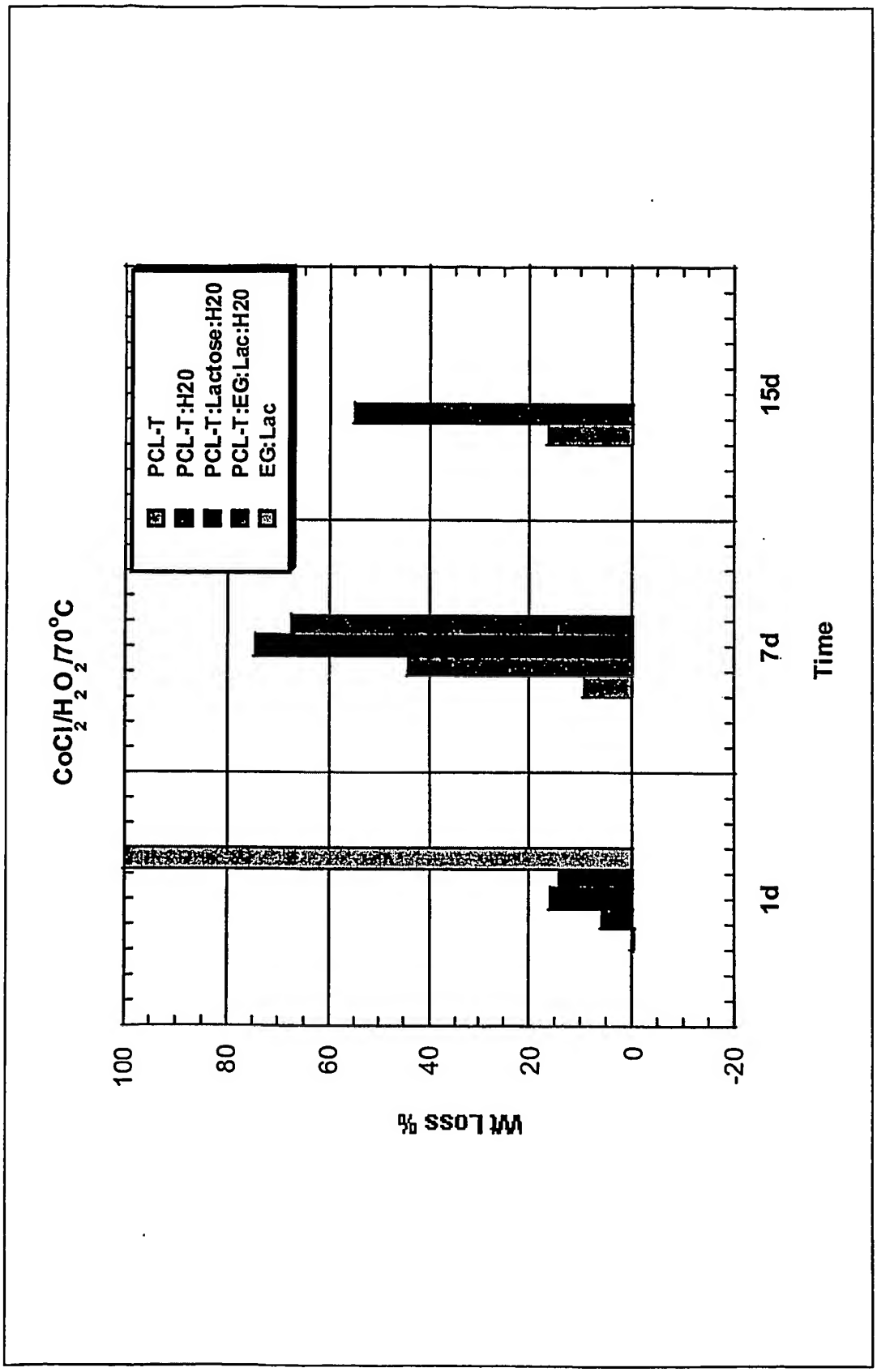

PCL-T
PCL-T:H20
PCL-T:Lactose:H20
PCL-T:EG:Lac:H20
EG:Lac
CoCl2/H2O2/70°C
Wt Loss %
100
80
60
40
20
0
-20
1d
7d
15d
Time

Figure 10

Figure 11

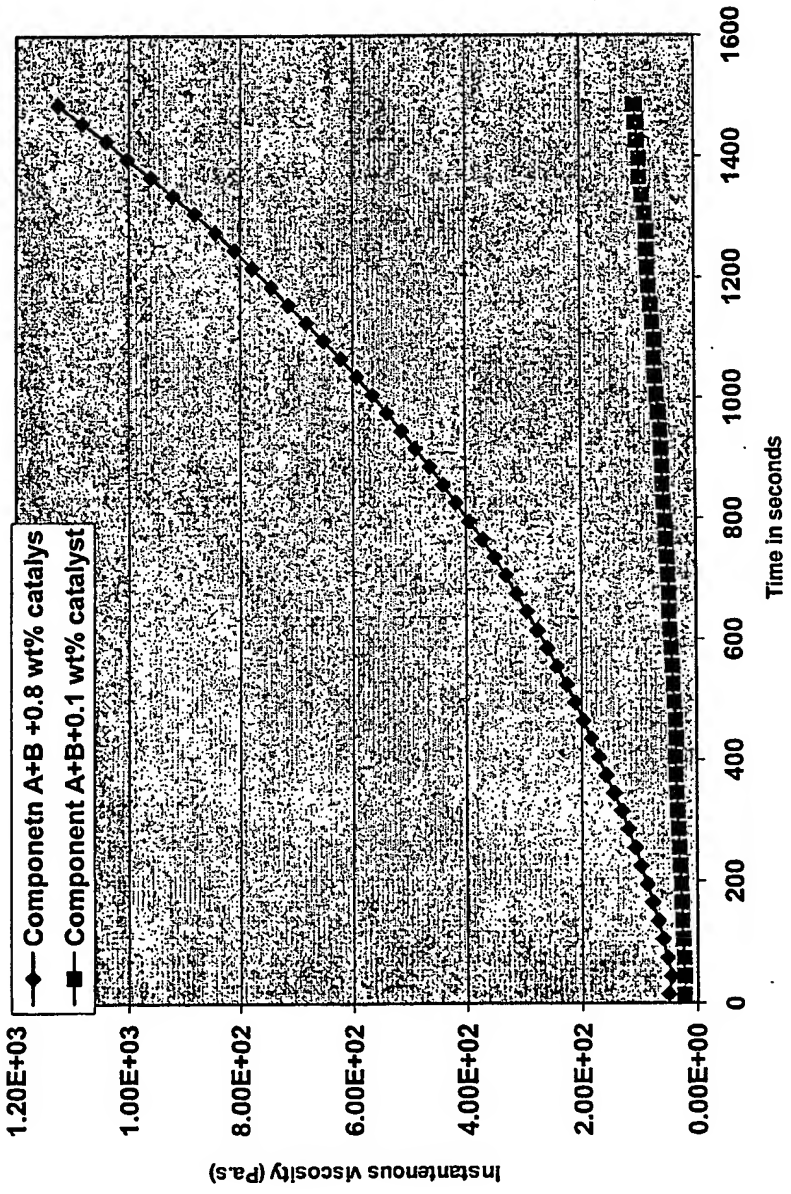


Figure 12: Change in polymer viscosity with curing time at 23°C

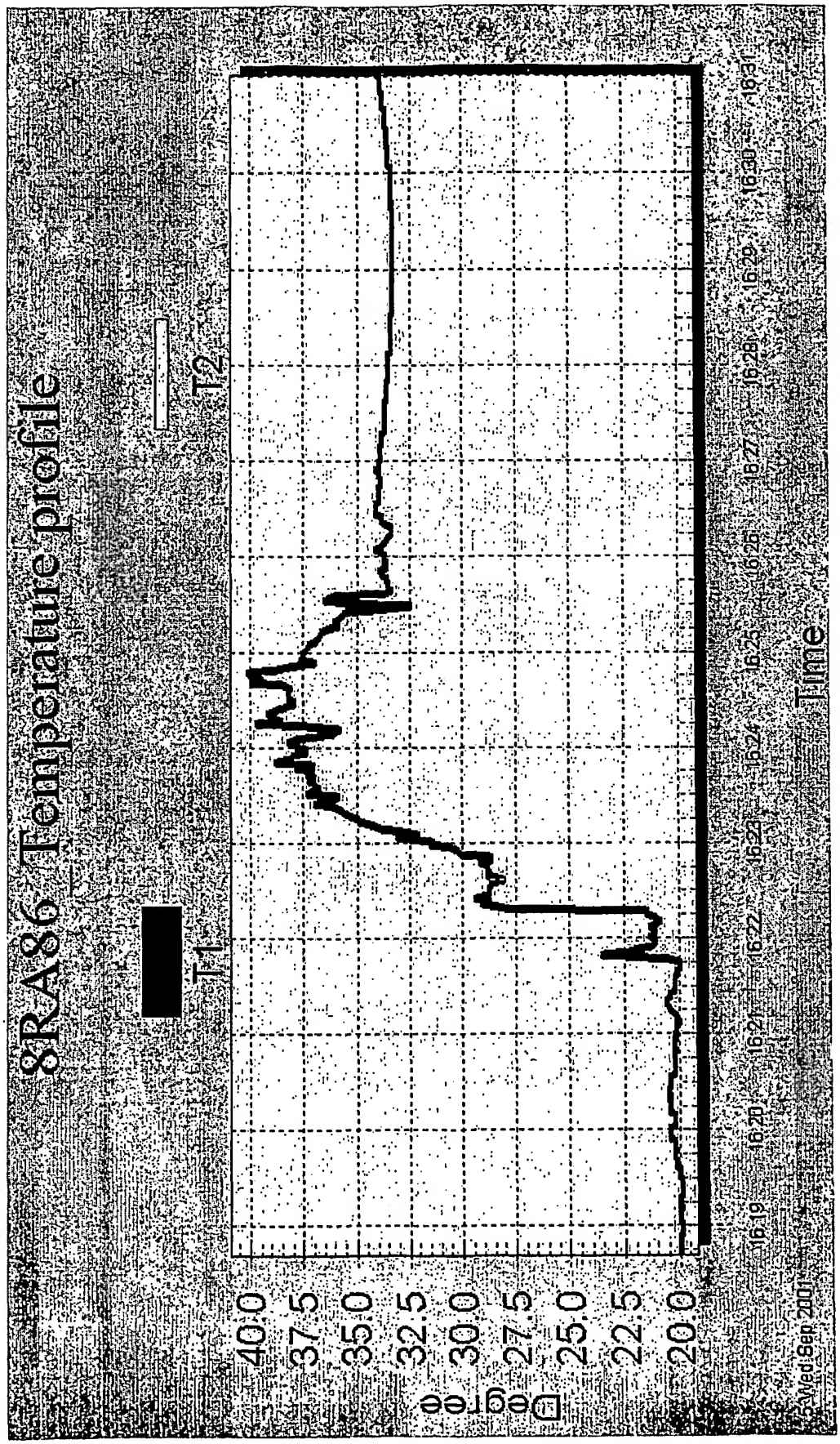


Figure 13. Temperature rise during polymer curing/gelling

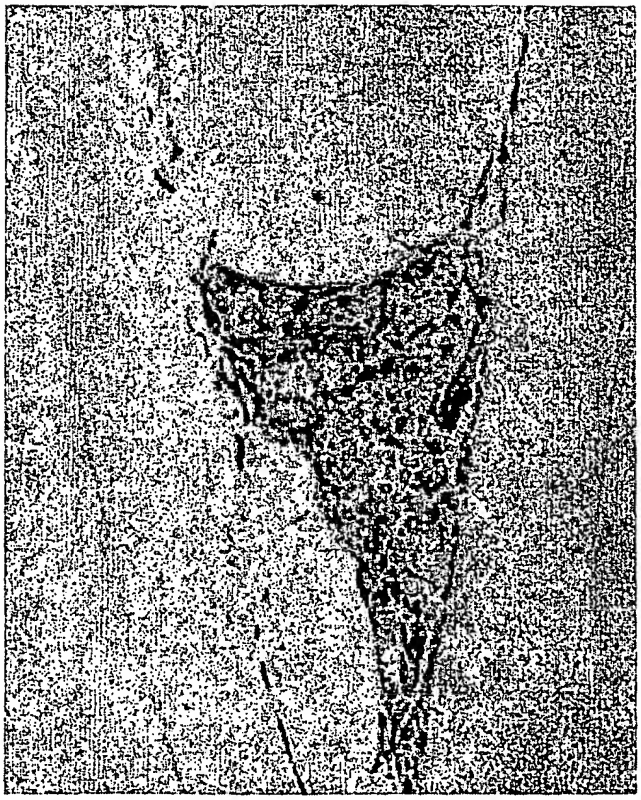


Figure 14. Haematoxylin & Eosin staining of a 6 week culture showing cluster of viable stem cells (purple) and new matrix (pink) within hollow fibres (transparent) within the polymer scaffold.

Figure 15. 6 week culture of human mesenchymal stem cells grown in hollow fibres within the polymer scaffold supplemented with differentiation medium to promote osteoblast differentiation. Sample is stained with von Kossa to show bone mineralisation (brown/black staining).

Figure 16. Haematoxylin & Eosin staining of a 4 week culture showing cluster of viable chondrocytes within resorbed gelatin beads within the polymer scaffold.

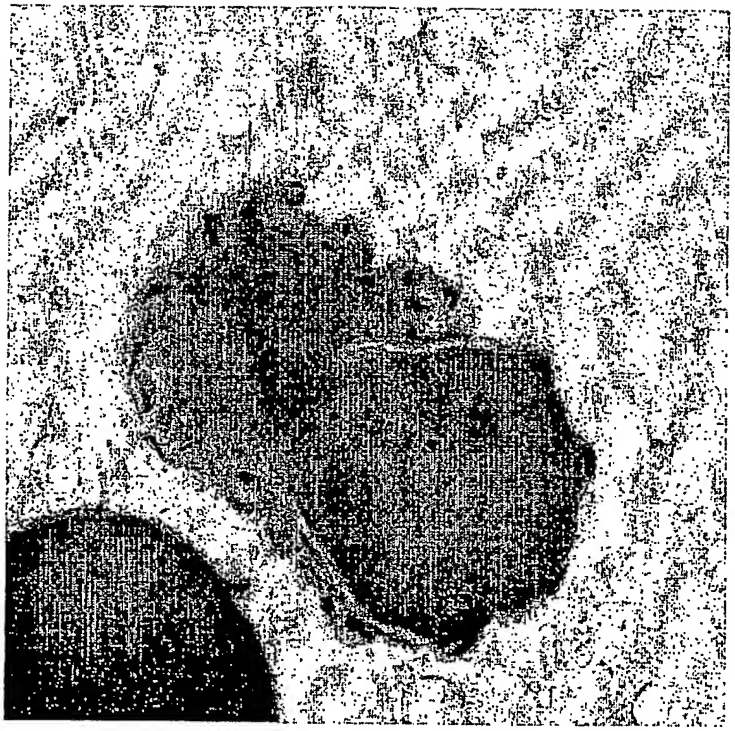


Figure 17. Alcian blue staining of a 9 week culture showing cluster of viable chondrocytes around gelatin beads within the polymer scaffold. Pink staining indicates cells and blue around cells indicates new glycosaminoglycan synthesis .

(a) Implant Sample # 1

Implant sample # 2

Figure 18: Micrographs showing cellular integration in to the polymer structure after 2-month implantation in rats (a) Polymer implant sample # 1 (b) Polymer implant sample #2.